

REMARKS

Claims 2-7, 9, 11-13, 15, 17-22, 24, and 26-43 are pending in the present application. Claims 1-43 were presented for examination. Claims 1, 8, 10, 14, 16, 23, and 25 have been cancelled by amendment.

In the office action mailed February 11, 2003, claims 1-3, 5, 7, 8, 16-18, 23, and 25 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,953,015 to Choi ("the Choi patent"). Claims 4, 10, 11, 13, 14, 19, 20, and 22 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Choi patent in view of National Semiconductor, *Easy Logarithms for COP400* ("the NS reference"). Claims 26-28, 30, 32, 33, 35-37, 39, 41, and 42, were rejected under 35 U.S.C. 103(a) as being unpatentable over the Choi patent in view of U.S. Patent No. 6,469, 700 to Munshi *et al.* ("the Munshi patent"). Claims 29 and 38 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Choi patent in view of the Munshi patent and further in view of the NS reference. Claims 6, 9, 12, 15, 21, 24, 31, 34, 40, and 43 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As previously mentioned, claims 1-3, 5, 7, 8, 16-18, 23, and 25 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Choi patent, and claims 4, 10, 11, 13, 14, 19, 20, and 22 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Choi patent in view of the NS reference. Without addressing the merits of the Examiner's rejections, claims 9, 15, and 24 have been rewritten in independent form including all of the limitations of the base claim and intervening claims. Therefore, claims 9, 15, and 24 are in condition for allowance. Amendment of these claims has been made to expedite the issuance of allowable subject matter, and should not be interpreted as reflecting Applicant's belief that the subject matter recited by the originally examined claims is unpatentable.

Claims 2-7, which have been amended to depend from claim 9, claims 11-13, which have been amended to depend from claim 15, and claims 17-22, which have been amended to depend from claim 24, are also in condition for allowance based on their dependency from allowable base claims 9, 15, and 24. That is, each of the dependent claims further narrows

the scope of the claim from which it depends, and consequently, if a claim is dependent from an allowable base claim, the dependent claim is also allowable.

For the foregoing reasons, claims 2-7, 9, 11-13, 15, 17-22, and 24 are in condition for allowance.

As previously mentioned, claims 26-28, 30, 32, 33, 35-37, 39, 41, and 42, have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Choi patent in view of the Munshi patent, and claims 29 and 38 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Choi patent in view of the Munshi patent and further in view of the NS reference.

The rejection of claims 26-30, 32, 33, 35-39, 41, and 42 under 35 U.S.C. 103(a) must be withdrawn because the Munshi patent, which as will be explained in more detail below, cannot be relied upon as prior art in supporting a rejection under 35 U.S.C. 103(a), in view of 35 U.S.C. 103(c). 35 U.S.C. 103(c) states:

“(c) Subject matter developed by another person, which qualifies as prior art only under one or more of subsections (e), (f), and (g) of section 102 of this title, shall not preclude patentability under [section 103] where the subject matter and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person.”

The Munshi patent was filed on June 24, 1998, prior to the filing of the present application, and was granted on October 22, 2002, subsequent to the filing of the present application. Therefore, the Munshi patent qualifies as prior art under 35 U.S.C. 102(e)(2).

With respect to common ownership, both the Munshi patent and the present application were, at the time the invention was made, owned by, or subject to an obligation of assignment to, the same person, namely, Micron Technology, Inc. Assignment of the Munshi patent is recorded at Reel/Frame number 010967/0129 on July 31, 2000, and assignment of the present application is recorded at Reel/Frame number 011373/0907 on December 12, 2000.

Therefore, under 35 U.S.C. 103(c), the rejection of claims 26-28, 30, 32, 33, 35-37, 39, 41, and 42, under 35 U.S.C. 103(a) as being unpatentable over the Choi patent in view of the Munshi patent, and the rejection of claims 29 and 38 under 35 U.S.C. 103(a) as being

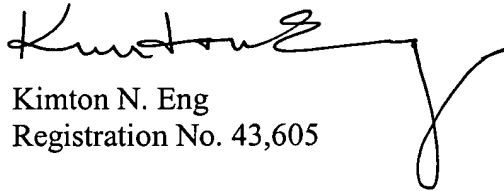
unpatentable over the Choi patent in view of the Munshi patent and further in view of the NS reference, cannot be maintained, and consequently, must be withdrawn.

Attached hereto is a marked-up version of the changes made to the claims by the current amendment. The attached page is captioned "Version with Markings to Show Changes Made".

All of the claims remaining in the application are now clearly allowable. Favorable consideration and a Notice of Allowance are earnestly solicited.

Respectfully submitted,

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Enclosures:

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claims 1, 8, 10, 14, 16, 23, and 25 have been cancelled.

Claims 2-5, 9, 11, 15, 17-20, and 24 have been amended as follows:

2. (Once amended) The method of claim 9 [1] wherein dividing the result by two comprises shifting a binary value of the LOD right one-bit.

3. (Once amended) The method of claim 9 [1] wherein calculating the square of the ratio comprises:

calculating the square of a first ratio between the number of texels for one pixel along a first axis and the square of a second ratio between the number of texels for one pixel along a second axis orthogonal to the first axis; and

selecting the greater of the square of the first ratio and the square of the second ratio for calculating the LOD.

4. (Once amended) The method of claim 9 [1] wherein the square of the ratio comprises an unsigned fixed-point binary value having a number of integer bits and fractional bits, and approximating a base-two logarithm of the square of the ratio comprises:

shifting the square of the ratio left by the number of leading zeros (LZs) and ignoring the most significant bit (MSB) of the resulting number to produce a first number;

calculating a six-bit signed integer value from the equation:

6-bit signed integer = [(number of integer bits - 1) - LZs];

concatenating the six-bit signed integer value to the first number; and

defining the five MSBs of the resulting number as the signed integer portion of the LOD.

5. (Once amended) The method of claim 9 [1] wherein the square of the ratio comprises an unsigned fixed-point binary value having an integer portion and a fractional portion.

9. (Once amended) A method for computing a level-of detail (LOD) for application of texels of a texture map to pixels of a graphics image, the method comprising:
calculating the square of the ratio between the number of texels for one pixel;
approximating a base-two logarithm of the square of the ratio; and
dividing the result by two to provide the LOD, the LOD being a signed fixed point binary value having an [The method of claim 8 wherein the] integer portion [is] five bits in length and further having a fractional portion.

11. (Once amended) The method of claim 15 [10] wherein the square of the ratio comprises an unsigned fixed-point binary value having an integer portion and a fractional portion.

15. (Once amended) A method for computing a level-of detail (LOD) for application of texels of a texture map to pixels of a graphics image, the method comprising:
calculating the square of a first ratio between the number of texels for one pixel along a first axis and the square of a second ratio between the number of texels for one pixel along a second axis orthogonal to the first axis;
selecting the greater of the square of the first ratio and the square of the second ratio for calculating the LOD;
shifting the selected square of the ratio left by the number of leading zeros (LZs) and ignoring the most significant bit (MSB) of the resulting number to produce a first number;
calculating a six-bit signed integer value from the equation:
6-bit signed integer=[(number of integer bits -1)-LZs],
where number of integer bits is the number of integer bits representing the selected square of the ratio;

concatenating the six-bit signed integer value to the first number;
defining the five MSBs of the resulting number as a signed integer portion; and
shifting the resulting binary number right by one-bit to provide the LOD, the LOD
being a signed fixed point binary value having an [The method of claim 14 wherein the] integer
portion [is] five bits in length and further having a fractional portion.

17. (Once amended) The apparatus of claim 24 [16] having a shifting circuit coupled to receive the result of the approximation and adapted to divide the approximation by two by shifting the approximation right one-bit.

18. (Once amended) The apparatus of claim 24 [16] wherein calculating the square of the ratio comprises:

calculating the square of a first ratio between the number of texels for one pixel along a first axis and the square of a second ratio between the number of texels for one pixel along a second axis orthogonal to the first axis; and

selecting the greater of the square of the first ratio and the square of the second ratio for calculating the LOD.

19. (Once amended) The apparatus of claim 24 [16] wherein the square of the ratio comprises an unsigned fixed-point binary value having a number of integer bits and fractional bits, and approximating a base-two logarithm of the square of the ratio comprises:

shifting the square of the ratio left by the number of leading zeros (LZs) and ignoring the most significant bit (MSB) of the resulting number to produce a first number;

calculating a six-bit signed integer value from the equation:

6-bit signed integer = [(number of integer bits - 1) - LZs];

concatenating the six-bit signed integer value to the first number; and

defining the five MSBs of the resulting number as the signed integer portion of the LOD.

20. (Once amended) The apparatus of claim 24 [16] wherein the square of the ratio comprises an unsigned fixed-point binary value having an integer portion and a fractional portion.

24. (Once amended) An apparatus adapted to receive signals representing texel coordinates for texels of a texture map and pixel coordinates for pixels of a graphics image to calculate a level-of-detail (LOD), the apparatus calculating the square of the ratio between the number of texels applied to one pixel from the texel and pixel coordinates, approximating a base-two logarithm of the square of the ratio, and dividing the result of the approximation by two to compute the LOD, the LOD being a signed fixed point binary value having an [The apparatus of claim 8 wherein the] integer portion [is] represented by five bits and further having a fractional portion.